Paper No. 20

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

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Ex parte UNSOON KIM

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Appeal No. 2001-0836
Application No. 08/991,448

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ON BRIEF

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Before HAIRSTON, BARRETT, and RUGGIERO, Administrative Patent Judges.

RUGGIERO, Administrative Patent Judge.

DECISION ON APPEAL

This is a decision on the appeal from the Examiner's rejection of claims 9, 11-14, and 23, which are all of the claims pending in the present application. Claims 1-8, 10, and 15-22 have been canceled.

The claimed invention relates to a flash memory having plural stacks in the core memory region, with each stack having at least one polysilicon layer on a tunnel oxide layer and at least one hemispherical-grained (HSG) layer above the polysilicon

layer. Each stack further includes at least one sidewall layer, with the HSG layer overlapping and contacting the sidewall layer. According to Appellant (specification, pages 2-4), the inclusion of the relatively large grain size HSG layer improves gate coupling, while the relatively small grain size of the polysilicon layer establishes a relatively flat surface interface with the tunnel oxide layer.

Claim 9 is illustrative of the invention and reads as follows:

> 9. A flash memory wafer, comprising:
>
> a core memory region including at least one silicon substrate; and
>
> plural stacks in the core memory region, each stack having at least one respective polysilicon layer on a tunnel oxide layer and at least one HSG layer above the polysilicon [sic, layer] each stack also having at least one sidewall layer, the HSG layer overlapping and contacting the sidewall layer.[1]

The Examiner relies on the following prior art:

Esquivel et al. (Esquivel)	4,855,800	Aug. 08, 1989
Yew et al. (Yew)	5,753,559	May 19, 1998 (filed Oct. 09, 1996)
Lim	5,879,989	Mar. 09, 1999 (filed Jan. 03, 1997)

[1]Both Appellant and the Examiner should note that the word "layer" is missing after "polysilicon," second occurrence, at line 4 of claim 9 as it appears in the amendment filed November 18, 1999, Paper No. 9.

Claims 9, 11-14, and 23 stand finally rejected under 35 U.S.C. § 103(a). As evidence of obviousness, the Examiner offers Yew in view of Lim with respect to claims 9, 14, and 23, and adds Esquivel to the basic combination with respect to claims 11-13.

Rather than reiterate the arguments of Appellant and the Examiner, reference is made to the Briefs[2] and Answer for the respective details.

OPINION

We have carefully considered the subject matter on appeal, the rejection advanced by the Examiner and the evidence of obviousness relied upon by the Examiner as support for the rejection. We have, likewise, reviewed and taken into consideration, in reaching our decision, Appellant's arguments set forth in the Briefs along with the Examiner's rationale in support of the rejections and arguments in rebuttal set forth in the Examiner's Answer.

It is our view, after consideration of the record before us, that the evidence relied upon and the level of skill in the

[2] The Appeal Brief was filed May 19, 2000 (Paper No. 15). In response to the Examiner's Answer dated August 1, 2000 (Paper No. 16), a Reply Brief was filed August 22, 2000 (Paper No. 17), which was acknowledged and entered by the Examiner in the communication dated September 6, 2000 (Paper No. 18).

particular art would not have suggested to one of ordinary skill in the art the obviousness of the invention as recited in claims 9, 11-14, and 23. Accordingly, we reverse.

In rejecting claims under 35 U.S.C. § 103, it is incumbent upon the Examiner to establish a factual basis to support the legal conclusion of obviousness. See In re Fine, 837 F.2d 1071, 1073-74, 5 USPQ2d 1596, 1598 (Fed. Cir. 1988). In so doing, the Examiner is expected to make the factual determinations set forth in Graham v. John Deere Co., 383 U.S. 1, 17, 148 USPQ 459, 467 (1966), and to provide a reason why one having ordinary skill in the pertinent art would have been led to modify the prior art or to combine prior art references to arrive at the claimed invention. Such reason must stem from some teaching, suggestion or implication in the prior art as a whole or knowledge generally available to one having ordinary skill in the art. Uniroyal, Inc. v. Rudkin-Wiley Corp., 837 F.2d 1044, 1051, 5 USPQ2d 1434, 1438 (Fed. Cir.), cert. denied, 488 U.S. 825 (1988); Ashland Oil, Inc. v. Delta Resins & Refractories, Inc., 776 F.2d 281, 293, 227 USPQ 657, 664 (Fed. Cir. 1985), cert. denied, 475 U.S. 1017 (1986); ACS Hosp. Sys., Inc. v. Montefiore Hosp., 732 F.2d 1572, 1577, 221 USPQ 929, 933 (Fed. Cir. 1984). These showings by the Examiner are an essential part

of complying with the burden of presenting a prima facie case of obviousness. Note In re Oetiker, 977 F.2d 1443, 1445, 24 USPQ2d 1443, 1444 (Fed. Cir. 1992).

With respect to the obviousness rejection of independent claims 9 and 23 based on the combination of Yew and Lim, Appellant asserts the Examiner's failure to establish a prima facie case of obviousness since all of the claim limitations are not taught or suggested by the applied prior art references. In particular, Appellant contends (Brief, pages 4 and 5; Reply Brief, page 2) that the structure resulting from the Examiner's proposed combination would not have an HSG layer in contact with a sidewall spacer layer as required by each of independent claims 9 and 23.

After careful review of the applied Yew and Lim references, we are in general agreement with Appellant's position as stated in the Briefs. In our view, if Yew and Lim were combined in accordance with the collective teachings of the references, the polysilicon layer 1 would lie between the HSG layer and the sidewall spacer, i.e., there would be no contact between the HSG layer and the sidewall spacer as claimed.

We recognize that, in attempting to address the language of appealed claims 9 and 23, the Examiner has suggested (Answer,

page 3) that a HSG layer subsequently deposited after formation of the floating gate 15 in Lin would necessarily contact the sidewall spacers 13. It is our opinion, however, that the Examiner has drawn this conclusion based on the unwarranted and unsupported assumption that such HSG layer would cover the same surface of the floating gate as the existing dielectric layer illustrated in Lim's Figure 3D. In order for us to sustain the Examiner's rejection under 35 U.S.C. § 103, we would need to resort to impermissible speculation or unfounded assumptions or rationales to supply deficiencies in the factual basis of the rejection before us. In re Warner, 379 F.2d 1011, 1017, 154 USPQ 173, 178 (CCPA 1967), cert. denied, 389 U.S. 1057 (1968), reh'g denied, 390 U.S. 1000 (1968).

We have also reviewed the Esquivel reference added to the proposed combination of Yew and Lim by the Examiner to address the isolation trench features of dependent claims 11-13. We find nothing in the disclosure of Esquivel, however, which would overcome the innate deficiencies of Yew and Lim discussed supra.

In view of the above discussion, it is our view that, since all of the limitations of the appealed claims are not taught or suggested by the applied prior art references, the Examiner has

not established a prima facie case of obviousness. Accordingly, the 35 U.S.C. § 103(a) rejection of independent claim 9 and its dependent claims 11-14, as well as independent claim 23, is not sustained.

In conclusion, we have not sustained the Examiner's 35 U.S.C. § 103(a) rejection of any of the claims on appeal. Therefore, the decision of the Examiner rejecting claims 9, 11-14, and 23 is reversed.

REVERSED

KENNETH W. HAIRSTON Administrative Patent Judge	)	
LEE E. BARRETT Administrative Patent Judge	)	BOARD OF PATENT APPEALS AND INTERFERENCES
JOSEPH F. RUGGIERO Administrative Patent Judge	)	

JFR:hh

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LARIVIERE GRUBMAN & PAYNE
P.O. BOX 3140
MONTEREY, CA 93942-3140